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Second Chance: Desktop Processors In A Mobile Form Factor

A Different Approach To Power Management With A Desktop CPU

WinBook takes a different approach to power management with the J4 than Dell did with its SmartStep 250N. The BIOS in the J4 utilizes a tiered throttling system when on battery power. The system monitors the battery charge capacity and adjusts accordingly. Throttling on battery power is obviously necessary due to the extremely high current draw desktop location of the CPU on the battery. In our test unit, when it was on a full charge and on battery power, the speed of the unit is reduced to 2.3GHz, which is only about 25% less than the 3.06GHz that you receive when the system is powered by AC.

Article Info

Second Chance: Desktop Processors In A Mobile Form Factor

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By:
David Stellmack

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Summary:

Recently, we reviewed the Dell SmartStep 250N. Things did not exactly proceed as planned in our review of this product. Now, we look at the WinBook J4 that uses a totally different strategy for throttling the Pentium 4 Northwood desktop CPU in a mobile form factor. The J4 has some very unique features that allow it to rival some desktop systems. When coupled with a 3.06GHz non-HyperThreaded CPU, what will the result be?

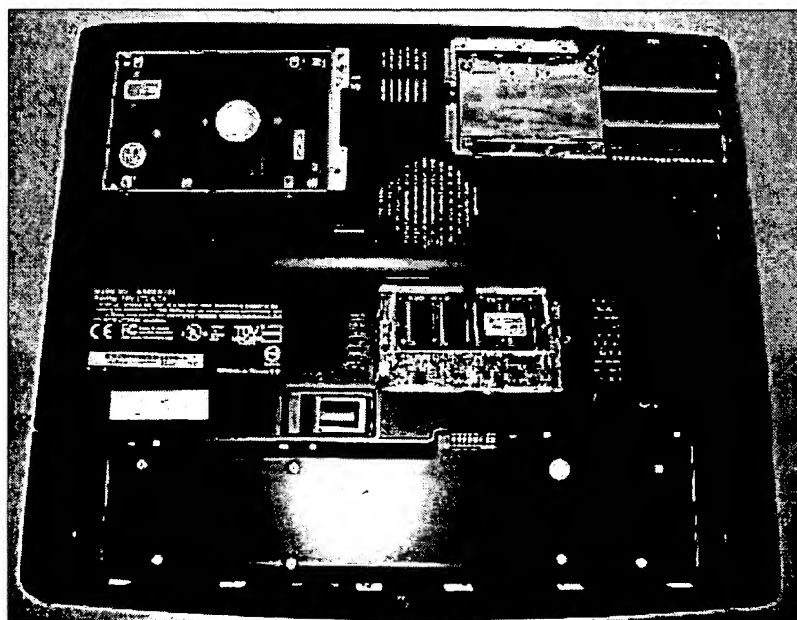
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The bottom of the WinBook J4 tells a lot of the story. Once the battery and the three access covers are removed, you can see the Intel Pentium 4 3.06GHz, as well as the 5400-RPM hard drive and the two SODIMM slots. This makes upgrades pretty easy. As you can see, it is very easy to add more RAM, upgrade the hard drive, and perhaps even

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upgrade the processor, if the thermal envelope of the J4 can handle it.


We asked Matt DeLille, the Lead Engineer for the WinBook J4, what would happen if they let the CPU run at full speed, what kind of issues he thought we would see. His response was the following:

1. The battery pack will overheat and trip the battery thermal sensor, causing the battery to protect itself (i.e. system shutdown).
2. Unrestricted current draw will play havoc with the battery smart card and the battery is unable to calibrate charge levels correctly. The idea is to have a controlled discharge instead of an exponential discharge (especially when the battery charge gets close to EDV1).
3. Unacceptable battery life (approximately 75 to 90 minutes if unrestricted and running a heavy load; less than that if the battery protects itself).

WinBook utilizes the following methods for BIOS throttling on the battery in order to prevent these issues from happening:

- If charge level is > 14%, then the system implements a 25% duty cycle. (The 3.06 would run at 75% speed or 2.3GHz.)
- If charge level is < 15%, then the system implements a 50% duty cycle. (The 3.06 would run at half speed or 1.5GHz.)

WinBook selected these levels because they offer optimum performance while protecting the battery/ system. This choice also addresses the concerns that we saw with battery management strategies in other units that throttle the CPU to half speed. The J4 does everything possible to make the battery last as long as possible. WinBook also offers the user the option of turning on ATI's Power Play technology, which also helps increase battery life.



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While it is obvious that WinBook cannot include all of the power saving features that the Pentium 4m offers, we found that WinBook's throttling strategy did allow the J4 to run at full speed while on battery. To that end, we saw some change between the scores on AC and Battery, when the battery had a full charge.

Battery Performance Tests	Result - Hours:Minutes
Battery Mark - Version 4.0	2:02
DVD Playback - ATI PowerPlay Enabled	1:47
DVD Playback - ATI PowerPlay Disabled	1:29

The battery performance scores were not as low as we thought they would be, but the DVD playback scores were slightly lower than we would have liked. If you choose a short DVD, or one that is 1 hour and 45 minutes, you should be able to get through the entire movie before the J4 shuts down. However, if you are watching a DVD with running time as long as "The Patriot" or "JFK," you will not be to see all of it on one battery charge.

[BACK](#) | [NEXT: How Does The 3.06GHz Pentium 4 Performance Stack Up?](#)

Table of Contents

- [Introduction](#)
- [The WinBook J4 - Specifications and Background](#)
- [A Different Approach To Power Management With A Desktop CPU](#)
- [How Does The 3.06GHz Pentium 4 Performance Stack Up?](#)
- [Conclusion - Good Performance & Nice Package](#)

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